Mecklenburg County Air Quality

PERMIT APPLICATION REVIEW SUMMARY

Title V

Section A: FACILITY INFORMATION			Existing	X	New	
Company Name (Legal Corporate Name)	Orbit Energy Charlotte, LLC					
Site Name (If Different From Above)						
Site Address (Street, City, Zip Code)	600 Johnson Road, Charlotte, NC 28206					
General Description of Business	Waste-to-energy biogas production plant					
Facility AQ Classification(s)	Title V	**Site Consistent w/ Zoning? (Y/N)**	Y			

Section B: APPLICATION INFORMATION			Modified	X	New	
Date of Application	7/12/2018	**Application Tracking Number**	2018-AQ-49555			
Date Complete Application Received	7/16/2018	**AQC Date/Public Comment Opens**	Posted online and newspaper; include on April 2019 agenda			
Confidentiality Requested?	No	**AQC Agenda Type:** Notice, Alternate, FYI	Notice			
Application Results: Brief description of actions requested by application and/or taken by MCAQ.		The facility believes there is potential to exceed major source thresholds. They are requesting to be reclassified from SM to Title V.				
Permit Issued as a Result of Application – Number:		**19-01V-021**				
Permit Voided as a Result of Application – Number:		18-085-021				

Section C: REGULATORY INFORMATION						
MCAPCO Regulations Applicable: List only specific conditions and/or regulations cited in permit issued. Indicate subpart for regulations 2.0524, 2.1110 & 2.1111.	2.0515 – Particulates from Miscellaneous Industrial Processes 2.0516 – Sulfur Dioxide Emissions from Combustion Sources 2.1104 – Toxic Air Pollutant Guidelines 2.1409 – Stationary Internal Combustion Engines 2.1418 – New Electric Generating Units, Large I/C Engines 2.1423 – Large Internal Combustion Engines 2.1111 - 40 CFR 63 Subpart ZZZZ – RICE MACT, 40 CFR 63 Subpart DDDDD – Boiler MACT 2.0524 - 40 CFR 60 Subpart JJJJ – NSPS - Stationary Spark Ignition I/C Engines					
Miscellaneous Applicability	**N**	**112r (40CFR68)**	**N**	**Strat. Ozone (40CFR82)**	**N**	**CAM (40CFR64)**
HAPs >10tpy, Potential Emissions: facility-wide	Formaldehyde					
TAPs Modeled: this application	None					

Section D: FACILITY- WIDE EMISSIONS INFORMATION

AIR POLLUTANTS	Calculated Actual Emissions With Control (tons/year)				
	Existing*	**New**	**Total**	**# Change + / (-)**	**% Change + / (-)**
Particulate Matter < 10 microns - PM-10	8.3	0	8.3	0	0
Particulate Matter < 2.5 microns – PM2.5	8.3	0	8.3	0	0
Sulfur Dioxide - SO_2	0	0	0	0	0
Nitrogen Oxides - NO_x	25.2	0	25.2	0	0
Carbon Monoxide - CO	12.6	0	12.6	0	0
Volatile Organic Compounds - VOC	52.9	0	52.9	0	0
All Hazardous Air Pollutants - HAPs	23.6**	0	23.6**	0	0

*Existing means actual emissions that were previously projected. Because the facility is not yet fully functional, there are no real existing emissions.
** Projected actual emissions were not available for HAP. This value represents Potential HAP emissions.

AQ Specialist Signature: Donna Cavaliere **Date Completed:** 3/6/2019

Supervisor Signature: Aaron Matijow **Date Approved:** 3/28/2019

SECTION A DETAILS

FACILITY INFORMATION

Detailed discussion of any items in Section A. At a minimum provide the following information:
1. Basis for permit: reason facility/source is "major" under Title V and submitting a Title V application
2. description of business operation (more detailed than summary page)

Basis for Permit:

Orbit Energy Charlotte has previously been classified as Synthetic Minor. Their original construction plan included the use of catalytic oxidizer control devices on the combined heat and power (CHP) units. During construction, they determined that catalytic oxidation control technology will not be feasible due to fouling of the catalysts. Therefore, they are requesting to be reclassified as a Title V facility.

Orbit Energy Charlotte has the potential to emit the following pollutants in excess of major source thresholds:
PM10/PM2.5
NOx
CO
VOC
HAP (Formaldehyde)

Business Operation:

Orbit Energy Charlotte, LLC (OEC) is proposing to construct a biogas production plant through anaerobic digestion of food waste and cellulose waste collected around the Charlotte metropolitan area for both electrical and thermal energy production.

The main components of the system are:

- Reception
- Squeezing System or Separation
- Pulping
- Anaerobic Digestion
- Gas Combustion
- Liquid/Solid Separation
- Liquid Thermostripping
- Solids Drying
- Solids Storage

Most of the OEC process is an enclosed system, however, emissions will result from digester gas combustion and solids drying.

Reception Building: Trucks bringing waste to the facility will enter the Reception Building to unload material for processing and squeezing out free water. The material then enters the bio-pulper to homogenize the waste. Air from the Reception Building, as well as the bio-pulper will pass through a packed-bed wet scrubber followed by a biofilter for odor control only. There are no regulated pollutant emissions from this part of the process.

Combined Heat & Power (CHP) Engines (ES-1): Digester gas will be combusted in two 2000 kW and one 1200 kW lean burn, spark ignition reciprocating internal combustion engines. The CHP units will operate using electronic control strategies to reduce NOx emissions

Safety Torches for combustion of methane gas during CHP maintenance (ES-1): Two small safety torches will be located between the digester and the CHPs. These are strictly safety devices to flare residual gas and prevent explosion when the CHPs are down for maintenance.

Solids Drying (ES-2): After digestion to extract the methane, the solids are centrifuged to remove free water. They are then transferred to a belt dryer to reduce the moisture content of the solid material. The belt dryer will have a 50% sulfuric acid / 50% water wet scrubber for control of ammonia, PM and VOC emissions. Heat for the belt dryer is provided by the CHP engines.

Boiler (IA ES-3): A 4.12 mmBtu/hr biogas and natural gas-fired boiler will be used to provide additional heat to the belt dryer when needed.

The facility began construction; however, continuing problems necessitated a full shutdown and equipment retrofit. They are currently in the process of completing the retrofit and testing batches of feedstock in an attempt to initiate full startup and operation.

SECTION B DETAILS

APPLICATION INFORMATION

[List all emission sources[1] (permitted and exempt) reviewed as a result of this application, their associated control devices and pollutants. Provide a detailed discussion of any other items in Section B at bottom under "Application Notes"]

EMISSION SOURCE ID	EMISSION SOURCE DESCRIPTION 1. Type, manufacturer, capacity 2. Control device with ID (if any)	POLLUTANT (s) EMITTED	MISCELLANEOUS NOTES	Previous Permit No.
ES-1	Three (3) Combined Heat and Power units each with a Lean Burn, Spark Ignition, Internal Combustion Engine burning digester gas including: - **CHP-1**: One (1) 2,000 kW (2,682 BHP) engine. - **CHP-2**: **One** (1) 2,000 kW (2,682 BHP) engine. - **CHP-3**: One (1) 1,200 kW (1,609 BHP) engine.	$PM/PM_{10}/PM_{2.5}$, NO_x, CO, VOC, HAP	No change to equipment since the last permit.	18-085-021
	Two (2) **safety torches** to flare residual gas from the digesters during CHP maintenance.	$PM/PM_{10}/PM_{2.5}$, NO_x, CO, VOC, SO_2, HAP	No change	18-085-021
ES-2	Two (2) Solid Fraction **Digestate Belt Dryers** **CD-DBD1 & CD-DBD2:** Two (2) two-stage Spray Scrubbers for Ammonia, PM and VOC control.	$PM/PM_{10}/PM_{2.5}$ VOC, Ammonia	No change	18-085-021
IA ES-3	One (1) **4.12 mmBtu/hr boiler** burning biogas and natural gas.	$PM/PM_{10}/PM_{2.5}$ NOx, CO, VOC, SO_2, HAP	This boiler meets the definition of an Insignificant Activity under MCAPCO 1.5503 – Definitions, Paragraph (8) – Insignificant Activities because of Size or Production Rate. Potential emissions of criteria pollutants are each less than 5 tpy and potential emissions of HAP are each less than 1000 lb/yr.	18-085-021

[1] *Note: In accordance with MCAPCO 1.5508(x), regulated fugitive emissions (from any of the 27 categories) as defined in 40 CFR 70.2 or for HAP emission purposes, shall be included in the same manner as stack emissions. All regulated fugitive emission sources may be grouped and listed as one (1) emission source under Emission Source ID No.*

SECTION C DETAILS

REGULATORY INFORMATION

(Identify the MCAPCO Regulations reviewed because of this application. At minimum, the regulations already listed should be reviewed and a reason given for applicability or non-applicability. If a Regulation has a standard, list the standard and indicate how the source is in compliance.)

MCAPCO REGULATION NUMBER/TITLE	EMISSION SOURCE ID No(s). SUBJECT	NOTES ON REGULATION (compliance demonstration, applicability, etc.)
1.5500 Title V Provisions	All	The facility has potential to emit the following pollutants in excess of major source thresholds: (PM10/PM2.5, NOx, CO, VOC, HAP(Formaldehyde)) Only sources that are subject to PSD for another pollutant are required to address GHGs under PSD review and Title V permitting.
2.1104 Toxic Air Pollutant Guidelines	ES-2	Modeling for ammonia was performed in the past, using emission rates greater than potential (prorated to achieve 90% of AAL), and compliance was demonstrated. No new toxic review was triggered as a result of this application.
2.1110 NESHAP (40 CFR 61)	N/A	None of the emission sources at the facility emit any HAP that is regulated under a Part 61 NESHAP.
2.1111 NESHAP (40 CFR 63) (MACT)	ES-1 CHPs IA ES-3 Boiler	ES-1 is subject to Subpart ZZZZ for RICE generators. The units will comply with monitoring, recordkeeping, and reporting requirements including an annual compliance report due January 31 for the previous year. ES-3 is NOT subject to Subpart 6J for boilers because the unit will burn only gaseous fuel. ES-3 is subject to Subpart DDDDD Boiler MACT. The boiler will be in the subcategory "units designed to burn gas 1 fuels" and will have to complete a tune-up every 5 years and conduct fuel specification analyses. OEC will also comply with the recordkeeping and reporting requirements.
2.0524 New Source Performance Standards	ES-1 CHPs IA ES-3 Boiler - N/A	The engines are subject to NSPS Subpart JJJJ for lean burn, spark ignition engines greater than 500 HP manufactured after July 1, 2010. The facility will be required to stack test and meet emission standards. In addition, they must also meet the SB3 BACT analysis requirements for good combustion control based on manufacturer design that will meet the NSPS standard. ES-3 is NOT subject to NSPS Subpart Dc because the boiler is rated less than 10 mmBtu/hr
2.0530 Prevention of Significant Deterioration	N/A	Note: Mecklenburg County is currently an attainment or maintenance area for all PSD pollutants. The facility is classified as a minor source for PSD purposes.
2.0544 Prevention of Significant Deterioration for Greenhouse Gases	N/A	Based on the June 23, 2014 U.S. Supreme Court ruling, GHG emissions alone cannot trigger a PSD review. Sources already subject to PSD for other pollutant(s) are required to review GHGs under PSD. (see above) For GHGs the facility is classified as minor for both PSD and Title V.
2.2100 Risk Management Program (40 CFR 68)	N/A	The facility is not subject to 40 CFR 68 – "Prevention of Accidental Releases" – Section 112(r) as indicated on the A-1 form submitted in the application.
2.2600 Source Testing	ES-1 CHPs	Stack testing is required as a result of this permit action. Testing will be required to demonstrate compliance with NSPS JJJJ, and MCAPCO 2.1409, 2.1418, 2.1423. Testing will also be required as part of each 5-year renewal application for the Title V permit. Note: Startup of the plant has been delayed due to the need for re-engineering and equipment retrofits. MCAQ has granted an extension for stack testing until the plant is producing enough biogas to perform a test. Orbit is required to submit monthly progress reports until startup and testing can be completed.

MCAPCO REGULATION NUMBER/TITLE	EMISSION SOURCE ID No(s). SUBJECT	NOTES ON REGULATION (compliance demonstration, applicability, etc.)
2.2600 Source Testing (cont'd)	ES-2 N/A	Stack testing will not be required for toxics (ammonia) (ES-2) because Orbit is claiming 85% control and they modeled at a potential emission rate. MCAQ accepts 85% as an acceptable "default" control efficiency for scrubbers controlling inorganic compounds, therefore, no testing is required.
Senate Bill 3 – Best Available Control Technology	ES-1	In accordance with NC General Statute 62-133.7, the "Renewable Energy and Energy Efficiency Portfolio", an air permit application for a new renewable energy facility must comply with the requirements for installation of BACT on the energy producing combustion sources in order to generate Renewable Energy Credits. The facility is not major for any pollutants under the PSD criteria and is not subject to a Federal PSD BACT analysis. Therefore, the facility is subject to a case-by-case SB3 BACT analysis. The SB3 control levels are based on manufacturer specified achievable emission rates associated with good combustion control. Each of the three gensets will be 4-stroke, lean burn units equipped with engine controls that adjust the ignition timing and air/fuel ratio with variations in digester gas composition to meet the manufacturer specified emission rates. No post combustion add-on emission control systems will be used. See SB3 BACT analysis submitted with the original application for more details.
2.1210 – Commercial and Industrial Solid Waste Incineration units	N/A	Based on the February 13, 2013 memo from Don van der Vaart of NCDAQ, the USEPA has determined that gas conveyed in a pipe (e.g. digester gas) to a combustion unit is not a "contained gaseous material" and therefore not a "solid waste". The CISWI rule does not apply.
40 CFR 82: Stratospheric Ozone Protection	N/A	The facility is not subject to this rule.
40 CFR 64 Compliance Assurance Monitoring	N/A	The facility is not subject to this rule.
2.0503 – Particulates from Fuel Burning Indirect Heat Exchangers	N/A – IA ES-3	IA ES-3 is an Insignificant Activity and only biogas or natural gas will be fired. This rule will not be included in the permit.
2.0515 Particulates from Miscellaneous Industrial Processes	ES-2	The design rate is 3 tons per hour. Based on the equation $E=410(P)^{0.67}$, the allowable PM emission rate is 8.56 lb/hr. Each of the two belt dryers will be equipped with a spray scrubber for PM control. Compliance is expected.
2.0516 – Sulfur Dioxide Emissions from Combustion Sources	ES-1 Safety Torches IA ES-3 Boiler -N/A	ES-1 Safety Torches and ES-3 Boiler are the only sources of SO_2. Emissions from the safety torches are expected to be extremely low. Fuels used will only include biogas and natural gas. Compliance is expected. IA ES-3 is an Insignificant Activity and will not be subject.
2.1418 New Electric Generating Units, Large Boilers, and Large I/C Engines.	ES-1 (CHP-1 and CHP-2 only)	Lean burn stationary internal combustion engines rated at 2400 brake horsepower or greater are subject to this regulation. The 2000 kW generators will be subject. To comply with this rule, the generators must comply with the requirements of MCAPCO 2.1423. See below.
2.1423 Large Internal Combustion Engines	ES-1 (CHP-1 and CHP-2 only)	The 2000 kW generators are subject to this rule. Per the regulation, the maximum allowable NO_x emission concentration for these units is 125 ppm. This concentration is expressed as NO_2 corrected to 15 % ppmv stack gas oxygen on a dry basis, averaged over a rolling 30-day period. The facility is required to conduct performance testing because they chose not to install a CEMS. Calculations based on actual test results and correlation with actual operating parameters will be used to determine compliance.

MCAPCO REGULATION NUMBER/TITLE	EMISSION SOURCE ID No(s). SUBJECT	NOTES ON REGULATION (compliance demonstration, applicability, etc.)
2.1423 Large Internal Combustion Engines (cont'd)	ES-1 (CHP-1 and CHP-2 only)	A report documenting the engine's total NO_x emissions beginning May 1 and ending September 30 of each year will be required to be submitted to the Director by October 31 of each year. Additional recordkeeping requirements are also required by the rule.
2.1409 – Stationary Internal Combustion Engines	ES-1 (CHP-3 only)	ICE's with rated capacity greater than 650 hp but less than 2400 hp are subject to this regulation. NOx emission rate shall be less than 2.5 g/hp-hr. Annual source testing will be required as outlined in the rule ((f) > 475 hrs).

SECTION D DETAILS

EMISSION INFORMATION

CALCULATION METHOD CODES (List all that apply)	**1= Stack test result 2= Material (mass) balance 3= EPA approved information (AP-42, CTG, etc.) 4= Other (specify in Table below)**
CALCULATION REJECTION CODES (List all that apply)	**1= Calculation error 2= Wrong emission factor(s) used 3= Control efficiency(ies) not accepted 4= Other (Specify in Table below)**

EMISSION SOURCE ID NUMBER	CALCULATION METHOD CODE	ACCEPT OR REJECT?	CALCULATION REJECTION CODE	MCAQ CALCULATIONS ATTACHED?
All	3, 4 – manufacturers data	A		No

Estimated Facility Emissions

ES-1 - Three CHPs	Actual tpy	Potential before control tpy	Potential Controlled tpy
PM/PM10/PM2.5	0	1.83	1.83
NOx	25.2	72.99	72.99
CO	12.6	153.81	153.81
VOC	33.5	122.19	122.19
SO2	0	0	0
Formaldehyde	0	19.4	19.4

ES-1 – Two Safety Torches	Actual tpy	Potential before control tpy	Potential Controlled tpy
PM/PM10/PM2.5	0	0.39	0.39
NOx	0	75.32	75.32
CO	0	63.27	62.37
VOC	0	4.14	4.14
SO2	0	0.45	0.45

ES-2 Two Digestate Belt Dryers	Actual tpy	Potential before control tpy	Potential Controlled tpy
PM/PM10/PM2.5	8.3	106.2	15.3
NOx	0	0	0
CO	0	0	0
VOC	19.4	118.8	35.7
SO2	0	0	0
Ammonia	12.1	354.1	50.9

IA ES-3 - 4.12 mmBtu/hr Boiler	Actual tpy	Potential before control tpy	Potential Controlled tpy
PM/PM10/PM2.5	0	0.02	0.02
NOx	0	3.75	3.75
CO	0	3.15	3.15
VOC	0	0.21	0.21
SO2	0	0.02	0.02
Formaldehyde	0	0.0013	0.0013

Total	Actual tpy	Potential before control tpy	Potential Controlled tpy
PM/PM10/PM2.5	8.3	108.44	17.54
NOx	25.2	152.06	152.06
CO	12.6	220.23	219.33
VOC	52.9	245.34	162.24
SO2	0	0.47	0.47
Formaldehyde	0	19.4	19.4
Ammonia	12.1	354.1	50.9

SECTION E

SUPPORTING DOCUMENTATION

(Provide brief description of any ATTACHMENTS)

1. Application dated 7/12/2018
2. Copy of September 25, 2018 Initial Notification for NSPS Subpart JJJJ